Analysis of Systolic Backflow and Secondary Helical Blood Flow in the Ascending Aorta Using Vector Flow Imaging - DTU Orbit (09/11/2017)

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Secondary rotational flow and systolic backflow are seen in the ascending aorta and, in this study, were analyzed with the vector velocity method transverse oscillation. Twenty-five patients were scanned intra-operatively, and the vector velocities were related to estimates of transesophageal echocardiography and pulmonary artery catheter thermodilution, and associated with gender, age, aortic diameter, atherosclerotic plaques, left ventricular ejection fraction and previous myocardial infarctions. Secondary flow was present for all patients. The duration and rotational frequency ($p < 0.001$) and the duration and flow direction of the secondary flow ($p < 0.002$) were associated. Systolic backflow was present in 40% of the patients and associated with systolic velocities ($p < 0.002$) and the presence of atherosclerotic plaques ($p < 0.001$). No other significant associations were observed. The study indicates that backflow is injurious and that secondary flow is a normal flow phenomenon. The study also shows that transverse oscillation can provide new information on blood flow in the ascending aorta.

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